

I claim:

1. A thermokinetic mixer comprising:

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- Sub 23
- (a) a substantially cylindrical mixing chamber with an inside enclosing a shaft rotatable at relatively high speed substantially about the axis of the cylindrical mixing chamber, the mixing chamber adapted to receive particles of polymers and other material therein; and
  - (b) shaft extensions removable from the shaft, the shaft extensions adapted to encounter the particles and drive them at least in part to the inside surface such that substantial energy is imparted to them.

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2. The mixer of claim 1 wherein the shaft extensions comprise a base and an end portion, the end portion being removable from the base portion and the base portion being removable from the shaft.

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3. The mixer of claim 2 wherein the end portion comprises a tooth face comprising a major face, the major face being substantially flat and oriented such that when passing through a plane including the shaft axis the major face first encounters the plane with a leading edge of the major face and the major face extends along an acute angle therefrom away from the plane.

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4. The mixer of claim 3 wherein the leading edge comprises most of a height of the shaft extension.

5. The mixer of claim 3 wherein the shaft extension rises from the shaft to very close to the inside surface.

6. The mixer of claim 3 wherein the base portion is secured to the shaft by slot and key means.

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7. The mixer of claim 6 wherein the end portion comprises a substantially complete shield for the base portion from the particles during rotational operation of the mixer.

8. The mixer of claim 7 wherein the tooth face further comprises a lower bevel face extending away from the plane from a lower edge of the major face at a greater angle to the plane than the major face.

1-16 w/o traverse

9. The mixer of claim 8 wherein the tooth face further comprises a top face extending away from a top edge of the major face and adapted to drive the particles into the inside surface.

10. A thermokinetic mixer comprising:

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- Sub 57*
- (a) a substantially cylindrical mixing chamber with an inside enclosing a shaft rotatable at relatively high speed substantially about the axis of the cylindrical mixing chamber, the mixing chamber adapted to receive particles of polymers and other material therein;
  - (b) shaft extensions comprising a tooth face, each shaft extension adapted to encounter the particles and drive them at least in part to the inside surface such that substantial energy is imparted to them; and
  - (c) the tooth face comprising a major face, the major face being substantially flat and oriented such that when passing through a plane including the shaft axis the major face first encounters the plane with a leading edge of the major face and the major face extends along an acute angle therefrom away from the plane.

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11. The mixer of claim 10 wherein the shaft supports at least two rows 180 degrees apart of shaft extensions along the length of the shaft.

12. The mixer of claim 10 wherein the shaft supports at least four rows 90 degrees apart of shaft extensions along the length of the shaft.

13. The mixer of claim 10 wherein the leading edge comprises most of a height of the shaft extension.

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14. The mixer of claim 13 wherein the shaft extension rises from the shaft to very close to the inside surface.

*Sub 57*

15. The mixer of claim 13 wherein the tooth face further comprises a lower bevel face extending away from the plane from a lower edge of the major face at a greater angle to the plane than the major face.

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16. The mixer of claim 15 wherein the tooth face further comprises a top face extending away from a top edge of the major face and adapted to drive the particles into the inside surface.

✓ 17. A method of melt blending using thermokinetic mixer comprising:

*Sub 57*

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- (a) a substantially cylindrical mixing chamber with an inside enclosing a shaft rotatable at relatively high speed substantially about the axis of the cylindrical mixing chamber, the mixing chamber adapted to receive particles of polymers and other material therein;
- (b) shaft extensions comprising a tooth face, each shaft extension adapted to encounter the particles and drive them at least in part to the inside surface such that substantial energy is imparted to them;
- 10 (c) the tooth face comprising a major face, the major face being substantially flat and oriented such that when passing through a plane including the shaft axis the major face first encounters the plane with a leading edge of the major face and the major face extends along an acute angle therefrom away from the plane; and
- 15 (d) operating the mixer at above about 1500 rpm with a mixture comprising sufficient polymer particles having meltable by thermokinetic mixing for and for sufficient time that a melt blended mixture is obtained thereby.
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